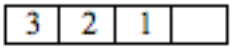
Objective 1:

1. The sliding tile puzzle consists of three tiles labeled A, B, and C, and an empty space in the following initial configuration:



The puzzle has two legal moves :

1. A tile may move into adjacent empty location.
2. A tile can hop over one or two other tiles into the empty position.

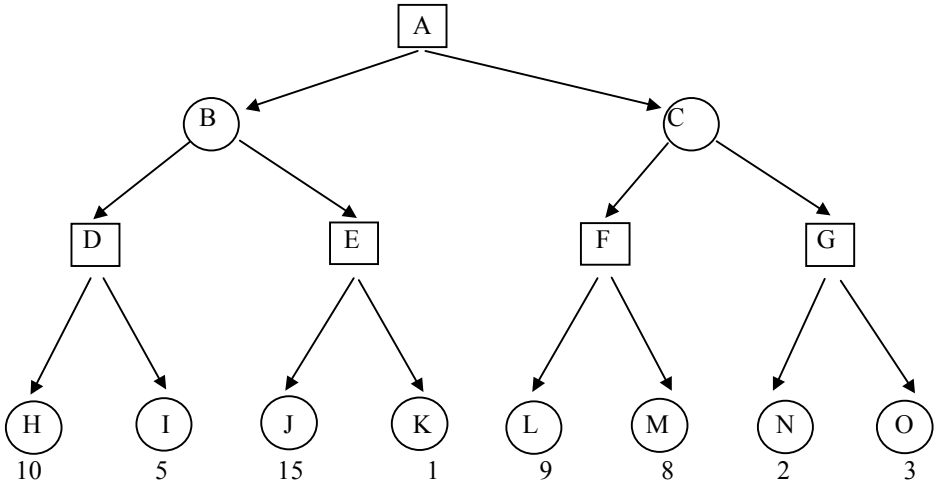
The goal is to sort the labeled tiles in ascending order. The position of the blank in the gold node is either the first position or the last position.

I. Apply depth first search algorithm to obtain the first solution.

II. Propose a heuristic function for solving this problem and apply the A* algorithm.

Objective 6:

2. Perform α-β minimax search on the following tree.



Objective 2:

3. The following figure contains an instance of 3-puzzle, where the initial and the goal node are shown. Assume the Manhattan distance as the heuristic function h'. Apply the A* algorithm and label the nodes of the search tree.

Initial

Goal

Objective 5:

4. Draw a decision tree for the problem of deciding whether or not to move forward at a road intersection given that the light has just turned green.

Objective 4:

5. a. Translate the following sentence into first-order logic:

For any x and y, if x is taller than y, then y is shorter than x.

b. Translate the following sentence from first-order logic into English:

$\exists x.\ \text{Hit}(\text{Tom}, x) \wedge \text{used}(\text{Tom}, \text{Hammer})$